

WHAT IS CLAIMED IS:

1. Substantially purified BIN1 polypeptide, wherein said polypeptide has receptor kinase activity and is a receptor for brassinosteroids.

2. The polypeptide of Claim 1, wherein said polypeptide has a molecular weight of approximately 130 kD, as determined by SDS-PAGE.

3. The BIN1 polypeptide of Claim 1, wherein the amino acid sequence of said protein is substantially the same as the amino acid sequence set forth in SEQ ID NO: 2.

4. The BIN1 polypeptide of Claim 1, wherein the polypeptide comprises the amino acid sequence set forth in SEQ ID NO: 2.

5. The BIN1 polypeptide of Claim 3, wherein amino acid residue 611 is changed from glycine to glutamic acid.

6. The BIN1 polypeptide of Claim 1, wherein said receptor kinase activity is activated by brassinolide.

7. The BIN1 polypeptide of Claim 1, wherein said polypeptide has a brassinosteroid binding affinity of approximately $K_d=7.4\pm0.9$ nM to 10.8 ± 3.2 nM.

8. The BIN1 polypeptide of Claim 1, wherein the Alanine at position 1031 is replaced by Threonine.

9. The BIN1 polypeptide of Claim 1, wherein the Threonine at position 740 is replaced by an Isoleucine.

10. The BIN1 polypeptide of Claim 1, wherein said polypeptide is from *Arabidopsis thaliana*.

11. A substantially purified peptide comprising approximately 70 amino acids of the BIN1 extracellular domain, wherein said peptide binds to brassinosteroids.

12. The peptide of Claim 11, wherein said peptide has an amino acid sequence corresponding to about amino acid residue 588 to 649 of SEQ ID NO: 2.